

ABSTRACT OF THE DISCLOSURE

Fast, bright inorganic scintillators at room temperature are based on radiative electron-hole recombination in direct-gap semiconductors, e.g. CdS and ZnO. The direct-gap semiconductor is codoped with two different impurity atoms to convert the semiconductor to a fast, high luminosity scintillator. The codopant scheme is based on dopant band to dopant trap recombination. One dopant provides a significant concentration of carriers of one type (electrons or holes) and the other dopant traps carriers of the other type. Examples include CdS:In,Te; CdS:In,Ag; CdS:In,Na; ZnO:Ga,P; ZnO:Ga,N; ZnO:Ga,S; and GaN:Ge,Mg.